DISTURBANCE APPENDIX
CHAPTER 4 – SURFACE DISTURBANCE FROM BLM AUTHORIZED REASONABLY FORESEEABLE ACTIONS

INTRODUCTION

This appendix contains information on the assumed BLM authorized surface disturbance over the long-term (next 20 years) by Alternative. The surface disturbance estimations are illustrated by a resource use (e.g. oil and gas development) and by a resource benefit activity (e.g. watershed enhancement project).

METHODOLOGY

The oil and gas, coal, locatable minerals, and mineral material programs have standalone Reasonably Foreseeable Development (RFD) Scenarios contained with the *Minerals Appendix*. The program specific RDFs provide the methodology and assumptions for the BLM authorized surface disturbance acreage contained in Table 1 below.

For the other resource use development acres and resource benefit project acres the following was utilized to determine the assumed acres of surface disturbance. The first step in the process was to provide an unconstrained scenario. The assumption for the unconstrained scenario was that there would be no restrictions on the resource use development or the resource benefit projects. From this unconstrained scenario, each BLM specialist relied on historical information (e.g. miles of BLM authorized fence constructed in the last 10 years) and professional judgment to determine how many acres of BLM authorized surface disturbance would occur in the planning area.

The second step involved utilizing GIS to calculate by Alternative the number of BLM administered acres where surface disturbing activities would not be allowed: Alternative A – 119,915 acres; Alternative B – 2,193,327 acres; Alternative C – 168,777 acres; Alternative D – 108,780 acres; and Alternative E – 93,555 acres. As the last step, the baseline number was reduced by the percentage of the BLM administer acres allowing surface disturbance.

Clarifications

Here is a list of clarifications on some of the calculations the reader will observe in the tables in this Appendix:
- Coal - A management common to all alternatives action to carry forward coal leasing decisions from previous land use planning documents does not change by alternative; therefore the acreages do not change.
- Locatable – The development of locatable minerals is governed by the 1872 Mining Law and therefore the management options for denying development are very limited. See the *Minerals Section* in Chapter 3 and the *Minerals Appendix* for more information.
- Mineral Materials – The acreage development acres for mineral materials (e.g. sand and gravel) was not changed per alternative because it is a discretionary action.
- Fuels Treatments – Includes only acres from soil disturbance (e.g. fire line construction) and not from the fire itself.
- Forestry Projects – The reader will notice the major driver in the change of acreages for resource uses between Alternatives A, C, D, and E is the Forestry Projects category. This reasoning is that the current land use plans are either very restrictive or do not allow forestry projects. The data used for qualification is historical timber information, but does not infer that forestry product is strictly for sawmill use.

TABLE 1.
ANTICIPATED SURFACE DISTURBANCE ACREAGES[1] FOR EACH ALTERNATIVE FROM BLM ASSUMED ACTIONS

Type of Disturbance	Unconstrained Acres[2]	Alternative A Acres[2,3]	Alternative B Acres[2,4]	Alternative C Acres[2,5]	Alternative D Acres[2,6]	Alternative E Acres[2,7]
Water; Riparian and Wetland Areas						
Watershed Enhancement Projects						
Short-term Disturbance	2,000	1,900	700	1,900	1,900	1,900
Assumes up to 10 acres of disturbance per project	20 – 200 projects	19 – 190 projects	7 – 73 projects	19 – 190 projects	19 – 190 projects	19 – 190 projects
Reclaimed	2,000	1,900	700	1,900	1,900	1,900
Long-term Disturbance	0	0	0	0	0	0
Riparian/Wetland Projects						
Acres Short-term Disturbance	2,000	1,900	700	1,900	1,900	1,900
Assumes up to 10 acres of disturbance per project	20 – 200 projects	19 – 190 projects	7 – 73 projects	19 – 190 projects	19 – 190 projects	19 – 190 projects
Reclaimed	2,000	1,900	700	1,900	1,900	1,900
Long-term Disturbance	0	0	0	0	0	0
Vegetation						
Mechanical Treatments						
Short-term Disturbance	40,000	38,000	15,000	38,000	38,000	39,000
Reclaimed	40,000	38,000	15,000	38,000	38,000	39,000
Long-term Disturbance	0	0	0	0	0	0
Fish and Wildlife						
Aquatic Wildlife Projects						
Short-term Disturbance	2,000	1,900	700	1,900	1,900	1,900
Assumes up to 10 acres of disturbance per project	20 – 200 projects	19 – 190 projects	7 – 73 projects	19 – 190 projects.	19 – 190 projects	19 – 190 projects
Reclaimed	2,000	1,900	700	1,900	1,900	1,900
Long-term Disturbance	0	0	0	0	0	0
Terrestrial Wildlife Projects						
Short-term Disturbance	2,000	1,900	700	1,900	1,900	1,900
Assumes up to 10 acres of disturbance per project	20 – 200 projects	19 – 190 projects	7 – 73 projects	19 – 190 projects	19 – 190 projects	19 – 190 projects
Reclaimed	2,000	1,900	700	1,900	1,900	1,900
Long-term Disturbance	0	0	0	0	0	0
Wildland Fire Management and Ecology						
Prescribed Fire						
Short-term Disturbance	2,000	1,900	700	1,900	1,900	1,900
Reclaimed	2,000	1,900	700	1,900	1,900	1,900
Long-term Disturbance	0	0	0	0	0	0

Type of Disturbance	Unconstrained Acres[2]	Alternative A Acres[2,3]	Alternative B Acres[2,4]	Alternative C Acres[2,5]	Alternative D Acres[2,6]	Alternative E Acres[2,7]
Cultural Resources; Paleontological Resources						
Cultural Resource Excavations						
Short-term Disturbance	20	19	4	14	19	19
Assumes up to 5 acres of disturbance per excavation	4 excavations	4 excavations	1 excavation	3 excavations	4 excavations	4 excavations
Reclaimed	20	19	4	14	19	19
Long-term Disturbance	0	0	0	0	0	0
Paleontological Resource Excavations						
Short-term Disturbance	150	140	30	110	140	150
Assumes up to 0.5 acre of disturbance per excavation	200 – 300 excavations	190 – 288 excavations	39 – 59 excavations	140 – 220 excavations	190 – 290 excavations	190 – 290 excavations
Reclaimed	150	140	30	110	140	150
Long-term Disturbance	0	0	0	0	0	0
Forestry and Woodland Products						
Timber Sales						
Short-term Disturbance	27,000	1,400	280	2,600	5,800	5,800
Assumptions	--	Assumes 72.4 acres of salvage harvest per year based on 652 acres over the period 1999-2007		Assumes 176.8 acres of commercial sawtimber harvest per year based on PSQ of 650 mbf/year and an average harvest of 3.677 mbf/acre over the period 1999-2007	Assumes 299.2 acres of commercial sawtimber harvest per year based on PSQ of 1,100 MBF/year and an average harvest of 3.677 mbf/acre over the period 1999-2007	
Reclaimed	27,000	1,400	280	2,600	5,800	5,800
Long-term Disturbance	0	0	0	0	0	0
Livestock Grazing						
Fence Development						
Short-term Disturbance	600	580	120	430	580	580
Assumes up to 1.2 acres of disturbance per mile of fence	500 miles of fence	480 miles of fence	98 miles of fence	360 miles of fence	480 miles of fence	480 miles of fence
Reclaimed	600	580	120	430	580	580
Long-term Disturbance	0	0	0	0	0	0
Pipeline Development						
Short-term Disturbance	950	920	190	690	920	920
Assumes up to 1.7 acres of disturbance per mile of pipeline	560 miles of pipeline	540 miles of pipeline	110 miles of pipeline	400 miles of pipeline	540 miles of pipeline	540 miles of pipeline
Reclaimed	950	920	190	690	920	920

Type of Disturbance	Unconstrained Acres[2]	Alternative A Acres[2,3]	Alternative B Acres[2,4]	Alternative C Acres[2,5]	Alternative D Acres[2,6]	Alternative E Acres[2,7]
Long-term Disturbance	0	0	0	0	0	0
Range Improvement Facility Development						
Short-term Disturbance	75	72	15	54	72	72
Assumptions	1 facility per 0.75 mile of pipeline and 0.1 acre of disturbance per facility					
Reclaimed	0	0	0	0	0	0
Long-term Disturbance	75	72	15	54	72	72
Reservoir/Pit Development						
Short-term Disturbance	740	710	0	530	710	710
Assumes 1 acre of disturbance per reservoir/pit	740 reservoirs/pits	710 reservoirs/pits	0 reservoirs/pits	530 reservoirs/pits	710 reservoirs/pits	710 reservoirs/pits
Reclaimed	0	0	0	0	0	0
Long-term Disturbance	740	710	0	530	710	710
Spring Development						
Short-term Disturbance	10	10	2	7	10	10
Assumes 0.25 acre of disturbance per spring development	40 spring developments	38 spring developments	8 spring developments	29 spring developments	38 spring developments	39 spring developments
Reclaimed	10	10	2	7	10	10
Long-term Disturbance	0	0	0	0	0	0
Well Development						
Short-term Disturbance	50	48	10	36	48	48
Assumes 0.25 acre of disturbance per well	200 wells	190 wells	39 wells	140 wells	191902 wells	190 wells
Reclaimed	50	48	10	36	48	48
Long-term Disturbance	0	0	0	0	0	0
Minerals						
Coal						
Short-term Disturbance	8,700	8,700	8,700	8,700	8,700	8,700
Reclaimed	3,100	3,100	3,100	3,100	3,100	3,100
Long-term Disturbance[8]	5,700	5,700	5,700	5,700	5,700	5,700
Oil and Gas						
Short-term Disturbance	3,600	3,400	2,200	3,500	3,500	3,100
Reclaimed	2,500	2,300	1,500	2,400	2,400	2,200
Long-term Disturbance	1,100	1,000	700	1,100	1,100	1,000
Locatable Minerals						
Short-term Disturbance	4,000	4,000	4,000	4,000	4,000	4,000
Reclaimed	3,000	3,000	3,000	3,000	3,000	3,000
Long-term Disturbance[9]	1,000	1,000	1,000	1,000	1,000	1,000
Mineral Materials						
Short-term Disturbance	500	480	190	480	490	490
Reclaimed	500	480	190	480	490	490
Long-term Disturbance[10]	0	0	0	0	0	0

Type of Disturbance	Unconstrained Acres[2]	Alternative A Acres[2,3]	Alternative B Acres[2,4]	Alternative C Acres[2,5]	Alternative D Acres[2,6]	Alternative E Acres[2,7]
Recreation						
Short-term Disturbance	1,000	960	200	720	960	970
Assumptions	50 recreational facilities	48 recreational facilities	10 recreational facilities	36 recreational facilities	48 recreational facilities	48 recreational facilities
Reclaimed	0	0	0	0	0	0
Long-term Disturbance	1,000	960	200	720	960	970
Renewable Energy						
Short-term Disturbance	1,100	1,000	210	830	1,100	730
Assumptions	Assumes 8 ROWs issued for utility-scale wind energy projects, 25 turbines/ project, and 1 utility-scale solar project		Assumes 2 ROW issued for utility-scale wind energy projects, 5 turbines/ project, and 1 utility-scale solar project	Assumes 6 ROWs issued for utility-scale wind energy projects, 19 turbines/ project, and 1 utility-scale solar project	Assumes 8 ROWs issued for utility-scale wind energy projects, 24 turbines/ project, and 1 utility-scale solar project	Assumes 5 ROWs issued for utility-scale wind energy projects, 17 turbines/ project, and 1 utility-scale solar project
Reclaimed	400	380	78	300	380	270
Long-term Disturbance	700	670	140	530	670	470
Lands and Realty – Rights-of-Way, Section 302 FLPMA Leases and Permits, and R&PP Leases						
Pipelines and Roads						
Short-term Disturbance	3,500	3,400	680	2,600	3,400	3,400
Assumes 50 percent of minor ROW and major pipeline ROW disturbance would be reclaimed in the long term	Assumes 1,040 minor ROWs and 12 major pipeline ROWs	Assumes 991 minor ROWs and 11 major pipeline ROWs	Assumes 202 minor ROWs and 2 major pipeline ROWs	Assumes 782 minor ROWs and 9 major pipeline ROWs	Assumes 998 minor ROWs and 12 major pipeline ROWs	Assumes 1,003 minor ROWs and 12 major pipeline ROWs
Reclaimed	1,800	1,700	340	1,300	1,700	1,700
Long-term Disturbance	1,800	1,700	340	1,300	1,700	1,700
Powerlines						
Short-term Disturbance	680	650	130	510	650	660
Assumes 1/3 of minor and major power line disturbance would be reclaimed in the long term	60 minor overhead powerline ROWs and 8 major powerline ROWs	57 minor overhead powerline ROWs and 8 major powerline ROWs	12 minor overhead powerline ROWs and 2 major powerline ROWs	45 minor overhead powerline ROWs and 6 major powerline ROWs	58 minor overhead powerline ROWs and 8 major powerline ROWs	58 minor overhead powerline ROWs and 8 major powerline ROWs
Reclaimed	450	430	88	340	440	440
Long-term Disturbance	230	220	44	170	220	220
Railroads						
Short-term Disturbance[11]	140	140	140	140	140	140
Reclaimed	0	0	0	0	0	0
Long-term Disturbance	140	140	140	140	140	140
CO_2 Pilot Projects						
Short-term Disturbance	180	170	30	130	170	170

Type of Disturbance	Unconstrained Acres[2]	Alternative A Acres[2,3]	Alternative B Acres[2,4]	Alternative C Acres[2,5]	Alternative D Acres[2,6]	Alternative E Acres[2,7]
Assumes 50 percent of CO_2 pilot project disturbance would be reclaimed in the long term	7 CO_2 pilot projects	7 CO_2 pilot projects	1 CO_2 pilot projects	5 CO_2 pilot projects	7 CO_2 pilot projects	7 CO_2 pilot projects
Reclaimed	90	80	20	70	80	80
Long-term Disturbance	90	80	20	70	80	80
Other Facilities						
Short-term Disturbance	260	250	50	200	250	250
Assumes 25 percent of 2920 permits and amendments will be reclaimed in the long term	20 new 2920 permits and 4 amendments to 2920 permits	20 new 2920 permits and 4 amendments to 2920 permits	3 new 2920 permits and 1 amendment to 2920 permits	14 new 2920 permits and 3 amendments to 2920 permits	16 new 2920 permits and 3 amendments to 2920 permits	20 new 2920 permits and 4 amendments to 2920 permits
Reclaimed	65	62	13	49	62	63
Long-term Disturbance	200	190	38	150	190	190
Cumulative Disturbance						
Maximum Short-term Disturbance	103,000	75,000	36,000	73,000	80,000	79,000
Maximum Reclaimed	91,000	62,000	27,000	62,000	67,000	67,000
Maximum Long-term Disturbance	13,000	12,000	8,300	11,000	12,000	12,000

[1]**All acres are assumed maximum values based on the assumptions made in Chapter 4 of the PRMP/FEIS. They should not be treated as exact values. All acres are rounded.**
[2]**Adding "Reclaimed" and "Long-term Disturbance" may not exactly equal "Short-term Disturbance".**
[3] **"Short-term Disturbance" under Alternative A are reduced below the Unconstrained scenario by 4.4 percent for resource, cultural, paleontological, forestry and woodland product, and recreation actions; 3.9 percent for livestock grazing actions; 4.7 percent for most ROW and renewable energy actions; and 3.3 percent for mineral materials actions.**
[4] **"Short-term Disturbance" under Alternative B are reduced below the Unconstrained scenario by 63.3 percent for resource actions; 80.4 percent for cultural, paleontological, forestry and woodland product, livestock grazing, and recreation actions; 80.6 percent for most ROW and renewable energy actions; and 62.0 percent for mineral materials actions.**
[5] **"Short-term Disturbance" under Alternative C are reduced below the Unconstrained scenario by 6.1 percent for resource actions; 27.8 percent for cultural, paleontological, forestry and woodland product, livestock grazing, and recreation actions; 24.8 percent for most ROW and renewable energy actions; and 4.5 percent for mineral materials actions.**
[6] **"Short-term Disturbance" under Alternative D are reduced below the Unconstrained scenario by 3.8 percent for resource, cultural, paleontological, forestry and woodland product, livestock grazing, and recreation actions; 4.0 percent for most ROW and renewable energy actions; and 1.6 percent for mineral materials actions.**
[7] **"Short-term Disturbance" under Alternative E are reduced below the Unconstrained scenario by 3.5 percent for resource, cultural, paleontological, forestry and woodland product, livestock grazing, and recreation actions; 3.5 percent for most ROW actions; 33.2 percent for renewable energy actions; and 2.1 percent for mineral materials actions.**
[8]**Assumes 35 percent of short-term disturbance would be reclaimed within 20 years based on a 10 to 13 year cycle from initial disturbance to final reclamation.**
[9]**Assumes 75 percent of short-term disturbance would be reclaimed within 20 years based on a 5-year cycle from initial disturbance to final reclamation.**
[10]**Assumes 5 mineral materials permits per year and a disturbance area of 5 acres per permit.**
[11]**Assumes 1 major railroad ROW.**